

REMARKS

Claims 1-19 are pending in the application. Claims 1, 8, and 15 are independent. In the present paper, no claims have been amended, canceled, or added.

Rejection of Claims 1-3, 6, 8-10, 13, and 15-18 Under 35 U.S.C. §103(a)

In the Office Action, the Examiner rejected claims 1-3, 6, 8-10, 13, and 15-18 under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 6,043,481 to Tan et al. (hereinafter “*Tan*”) in view of U.S. Patent No. 6,166,369 to Assadi et al. (hereinafter “*Assadi*”). Applicant respectfully traverses the rejection.

To establish a *prima facie* case of obviousness, the Examiner must show that the cited references teach each and every element of the claimed invention. (MPEP §2143.) *citing In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art. *KSR Int’l C. v. Teleflex, Inc.*, No 04-1350 (U.S. Apr. 30, 2007). If a combination or modification to a reference is used, an Examiner must show that there is some expectation of success that the combination or modification proffered would predictably result in the claimed invention. Obviousness is a question of law based on underlying factual inquiries. The factual inquiries enunciated by the U.S. Supreme Court in *KSR* include the *Graham* factors of determining the scope and content of the prior art, ascertaining the differences between the claimed invention and the prior art, and resolving the level of ordinary skill in the pertinent art.

Once the *Graham* factual inquiries are resolved, the Examiner must explain why the difference(s) between the cited references and the claimed invention would have been obvious to one of ordinary skill in the art. The rationale used must be a permissible rationale. The USPTO promulgated Examination Guidelines for Determining Obviousness in View of *KSR* in the Federal Register, Vol. 72, No. 195 (October 10, 2007). These *KSR* Guidelines enumerate permissible rationales and the findings of fact that must be made under the particular rationale.

It is not clear which rationale is used as the basis for the Examiner's rejection of claims 1-3, 6, 8-10, 13, and 15-18. However, the Court in *KSR* noted that combining known prior art elements is not sufficient to render the claimed invention obvious if the results would not have been predictable. When the prior art teaches away from combining certain known elements, such as by changing the principle of operation of one or more of the references and/or by making one or more of the references unsatisfactory for their intended purpose, *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983), discovery of successful means of combining them is more likely to be nonobvious. Just as many of the enumerated permissible rationales require some degree of predictability others require an expectation of success in that the proposed combination would result in the claimed invention. Applicant respectfully submits that the Examiner has not demonstrated that a person of ordinary skill in the art would combine *Tan* with *Assadi* to arrive at the claimed invention with some degree of predictability or an expectation of success.

In the Office Action, the Examiner states that *Tan* discloses a substrate 12, optoelectronic elements 14 in the substrate, a microlens element 18 over the optoelectronic elements 14, a raised ridge structure 19 surrounding the microlens elements 18, wherein the raised ridge structures 19 at least partially supports the microlens elements 18. The Examiner asserts further that the microlenses 18 overlay a base portion of the raised ridge structures 19 because such an overlay process is inherent in the reflow process of forming the microlens elements 18 between the ridge elements 19. The Examiner concedes the *Tan* fails to disclose a raised ridge structure that has a triangular cross-section, but cites *Assadi* for teaching a reflective structure 12 having a triangular cross-section surrounding a microlens 24. The Examiner then concludes that it would have been obvious to combine the reflective structure 12 of *Assadi* with the image sensor of *Tan* because it would allow more light to be reflected to the microlens for diffraction towards the photosensitive device thereby improving fill factor. Applicant respectfully disagrees.

It appears that the purpose of the ridges in *Tan* is to separate the microlenses 18 from each other. In *Assadi*, it appears the purpose of the reflective surfaces 12 is to diffract incoming light into the pixel 20. If a person of ordinary skill were to combine the ridges in *Tan* with the reflective surfaces in *Assadi* that person would not predict that the combination would result in

“a raised ridge structure surrounding said micro-lens, wherein said raised ridge structure has a triangular cross-section and at least partially supports said micro-lens, wherein the micro-lens overlays a base portion of the raised ridge structure” as recited in the present claims. Applicant respectfully submits that a person of ordinary skill would predict the opposite. This is because on one hand *Assadi* discloses that it is desirable to form microlenses 24 before forming the reflective surfaces 12. Thus, there is no way for the reflective surfaces 12 to confine the microlenses 24 during reflow and no need to at least partially support the microlenses 24. Moreover, even if the microlenses 24 did overly a base portion of the reflective surfaces 12, the surface area available for the reflective surfaces 12 to reflect and focus light onto a photosensitive device through the microlenses 24 would be diminished. There would be no expectation of a successful, improved product. Because there would be no expectation of success, there would be no predictability and thus claims 1, 8, and 15 are not rendered obvious over *Tan* in view of *Assadi*. Accordingly, claims 1, 8, and 15 are patentable over *Tan* in view of *Assadi*.

Applicant respectfully submits further with regard to claim 15 that the Examiner’s argument that *Assadi* teaches isotropic etching as a technique for forming the reflective elements 12 is in error. The Examiner cites Col. 2, line 54 to Col. 3, line 11 for this teaching. This portion of *Assadi* reads “Advantageously, the reflective surfaces 12 may be formed by a hybrid sol-gel glass. The hybrid sol-gel glass can be formed using low temperature formation processes. Thus, the glasses may be shaped and formed using techniques comparable to that utilized in connection with forming photoresists. That is, UV light may be used to expose a portion of the sol-gel material and to develop that material so that the remaining portion may be removed. Sol-gel glasses may be formed, for example, by hydrolysis of tetraethylorthosilicate (TEOS) and/or tetramethylorthosilicate (TMOS). After hydrolysis, these materials are subjected to oxolation or oxygen bridge formation in polycondensation. The result is a silicon oxide complex which is solvent swollen to form a polymerized network. If a photoinitiator is included in the complex, the material may be shaped using conventional photoresist patterning techniques. In accordance with one embodiment, a sol-gel hybrid glass can be prepared by hydrolysis polycondensation of the methacrylate group substituted silane in the presence of water. The *gel synthesis happens, allowing the* methylacryloxypropyl trimethoxysilane or glysidoxypropyltrimethylsilane

precursor material to react with diluted acid or base water solution, for example, in a molar ratio of 1:2 respectively for several hours.” (Emphasis added.)

The Examiner interprets this disclosure to mean that an etchant, *i.e.*, the diluted acid or base water solution, is used to chemically remove material from the substrate and states that “thus isotropic etching occurs to form the reflective surfaces 12. Applicant respectfully disagrees.

Applicant respectfully submits that *Assadi* is quite clear that the purpose of the diluted acid or base water solution is to react with the precursor material to facilitate gel synthesis. There is no disclosure in *Assadi* of any etching process, let alone “*isotropically etching* the top planarizing layer *to form a raised structure* over said top planarizing layer, said raised ridge structure encompassing said light sensitive element; and forming a microlens within the interior of said raised ridge structure and over said light sensitive element, *wherein said raised ridge structure has a triangular cross-section* and at least partially supports said micro-lens, wherein the micro-lens overlays a base portion of the raised ridge structure.” As such, this element of claim 15 is not disclosed in *Assadi*, as asserted by the Examiner. Nor is this element of claim 15 disclosed in *Tan*.

Applicant respectfully submits that because there would be no expectation of success, there would be no predictability that the combination of *Tan* and *Assadi* would result in the claimed invention claims 1, 8, and 15 are not rendered obvious over *Tan* in view of *Assadi*. Moreover, Applicant respectfully submits that *Tan* in view of *Assadi* fails to teach each and every element of claim 15. Accordingly, Applicant respectfully submits that claims 1, 8, and 15 are patentable over *Tan* in view of *Assadi*.

Claims 2-3 and 6 properly depend from claim 1 and are thus patentable for at least the same reasons that claim 1 is patentable. Claims 9-10 and 13 properly depend from claim 8 and are thus patentable for at least the same reasons that claim 8 is patentable. Claims 16-18 properly depend from claim 15 and are thus patentable for at least the same reasons that claim 15 is patentable. (MPEP §2143.03 (citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir.

1988)). Accordingly, Applicant respectfully requests that the Examiner reconsider and remove the rejection to claims 1-3, 6, 8-10, 13, and 15-18.

Rejection of Claims 4 and 11 Under 35 U.S.C. §103(a)

In the Office Action, the Examiner rejected claims 4 and 11 under 35 U.S.C. §103(a) as being obvious over *Tan* in view of *Assadi* in view of Applicant's admitted prior art. Applicant respectfully traverses the rejection.

Claim 4 properly depends from claim 1 and is thus patentable for at least the same reasons that claim 1 is patentable. Claim 11 properly depends from claim 8 and is thus patentable for at least the same reasons that claim 8 is patentable. (MPEP §2143.03 (citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988))). Accordingly, Applicant respectfully requests that the Examiner reconsider and remove the rejection to claims 4 and 11.

Rejection of Claims 5, 7, 12, 14, and 19 Under 35 U.S.C. §103(a)

In the Office Action, the Examiner rejected claims 5, 7, 12, 14, and 19 under 35 U.S.C. §103(a) as being obvious over *Tan* in view of *Assadi* in further view of view of U.S. Patent No. 5,396,090 to Nakai (hereinafter "*Nakai*"). Applicant respectfully traverses the rejection.

Claims 5 and 7 properly depend from claim 1 and are thus patentable for at least the same reasons that claim 1 is patentable. Claims 12 and 14 properly depend from claim 8 and are thus patentable for at least the same reasons that claim 8 is patentable. Claim 19 properly depends from claim 15 and is thus patentable for at least the same reasons that claim 15 is patentable. (MPEP §2143.03 (citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988))). Accordingly, Applicant respectfully requests that the Examiner reconsider and remove the rejection to claims 5, 7, 12, 14, and 19.

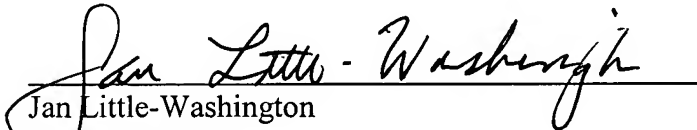
CONCLUSION

Applicant respectfully submits that all grounds for rejection have been properly traversed, accommodated, or rendered moot and that the application is now in condition for allowance. The Examiner is invited to telephone the undersigned representative if the Examiner believes that an interview might be useful for any reason.

Respectfully submitted,

BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP

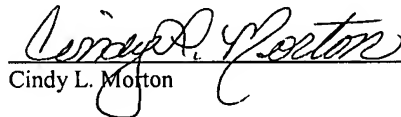
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Jan Little-Washington
Reg. No. 41,181

1279 Oakmead Parkway
Sunnyvale, CA 94085-4040
(206) 292-8600

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